

Certification Test Report

**FCC ID: RS2XSN1
IC: 5697A-XSN1**

**FCC Rule Part: 15.239
IC Radio Standards Specification: RSS-210**

ACS Report Number: 10-2062.W06.11.A

Applicant: XM Radio Inc.
Model: XSN1

Test Begin Date: **07-28-2010**
Test End Date: **08-11-2010**

Report Issue Date: 08-12-2010



FOR THE SCOPE OF ACCREDITATION UNDER LAB Code 200897-0

This report is not be used to claim certification, approval, or endorsement by NVLAP, NIST or any government agency.

Project Manager:

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EMC Engineer
Advanced Compliance Solutions, Inc.**

Reviewed by:

A handwritten signature in black ink, appearing to read "Kirby Munroe".

**Kirby Munroe
Director, Wireless Certifications
Advanced Compliance Solutions, Inc.**

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This report contains 30 pages

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1 GENERAL

1.1 Purpose

The purpose of this report is to demonstrate compliance with Part 15 Subpart C of the FCC's Code of Federal Regulations and Industry Canada's Radio Standards Specification RSS-210.

1.2 Product description

The XM Snap, Model No.:XSN1, is a Satellite Digital Audio Radio Service (SDARS) receiver for Sirius XM Radio. The unit is a vehicle accessory with a transmitter operating in the 88 - 108 MHz FM band. The XM Snap supplies the incoming satellite digital audio signal to the vehicle's radio via wired connection (Audio cable, FM Direct, or Cassette Adapter) or wireless FM transmission (Power Connect or FEA).

Mode of Operation	Frequency Range (MHz)	Number of Channels	Channel Separation (kHz)
FM	88.1 – 107.9	100	200

Applicant Information:

XM Radio Inc.
1500 Eckington PI, NE
Washington DC 20002

Manufacturer Information:

WNC (Kunshan) Corp.
NO.88 Central Avenue, Area B, Kunshan Export Processing Zone,
Kunshan City, Jiangsu, China

Test Sample Serial Number(s): JZA212M5, MNZ2124E.

Test Sample Condition: Good

1.3 Test Methodology and Considerations

The unit is tested receiving live XM programming. The unit was tested for radiated emissions in three configurations:

1. EUT in Power Connect mode with an auxiliary cable,
2. EUT with an FEA and a cassette adapter,
3. EUT with an FM Direct and an auxiliary cable.

The audio level were set to the maximum and the I/O cables were configured for worst case emissions during the evaluation.

Additionally, A/B comparison tests were performed to demonstrate that equivalent components for Fixed Coils, SMT, inductors L300 and L304, as described in the table below, led to equivalent results, within measurement tolerance.

	Inductor	Value	Description	Part Number	Manufacturer
Unit A	L300	150NH	0603	SWI0603F-R15J	Tai-Tech
	L304	1200NH	1008	SWI1008UF-1R2J	Tai-Tech
Unit B	L300:	150NH	0603	LLQ1608-FR15J	Toko
	L304:	1200NH	1008	1008CS-122XGLC	Coilcraft

2 TEST FACILITIES**2.1 Location**

The radiated and conducted emissions test sites are located at the following address:

Advanced Compliance Solutions, Inc.
3998 FAU Blvd, Suite 310
Boca Raton, Florida 33431
Phone: (561) 961-5585
Fax: (561) 961-5587
www.acstestlab.com

FCC Test Firm Registration #: 581606
Industry Canada Lab Code: 4175C-1

2.2 Laboratory Accreditations/Recognitions/Certifications

ACS is accredited to ISO/IEC 17025 by the National Institute of Standards and Technology under their National Voluntary Laboratory Accreditation Program (NVLAP), Lab Code 200897-0. Unless otherwise specified, all tests methods described within this report are covered under the ISO/IEC 17025 scope of accreditation.

2.3 Radiated & Conducted Emissions Test Site Description

2.3.1 Semi-Anechoic Chamber Test Site

The EMC radiated test facility consists of an RF-shielded enclosure. The interior dimensions of the indoor semi-anechoic chamber are approximately 48 feet (14.6 m) long by 36 feet (10.8 m) wide by 24 feet (7.3 m) high and consist of rigid, 1/8 inch (0.32 cm) steel-clad, wood core modular panels with steel framing. In the shielded enclosure, the faces of the panels are galvanized and the chamber is self-supporting. 8-foot RF absorbing cones are installed on 4 walls and the ceiling. The steel-clad ground plane is covered with vinyl floor.

The turntable is driven by pneumatic motor, which is capable of supporting a 2000 lb. load. The turntable is flushed with the chamber floor which it is connected to, around its circumference, with metallic loaded springs. An EMCO Model 1051 Multi-device Controller controls the turntable position.

A pneumatic motor is used to control antenna polarizations and height relative to the ground. The height information is displayed on the control unit EMCO Model 1050.

The control room is an RF shielded enclosure attached to the semi-anechoic chamber with two bulkhead panels for connecting RF, and control cables. The dimension of the room is 7.3 m x 4.9 m x 3 m high and the entrance doors of both control and conducted rooms are 3 feet (0.91 m) by 7 feet (2.13 m).

A diagram of the Semi-Anechoic Chamber Test Site is shown in Figure 2.3.1-1 below:

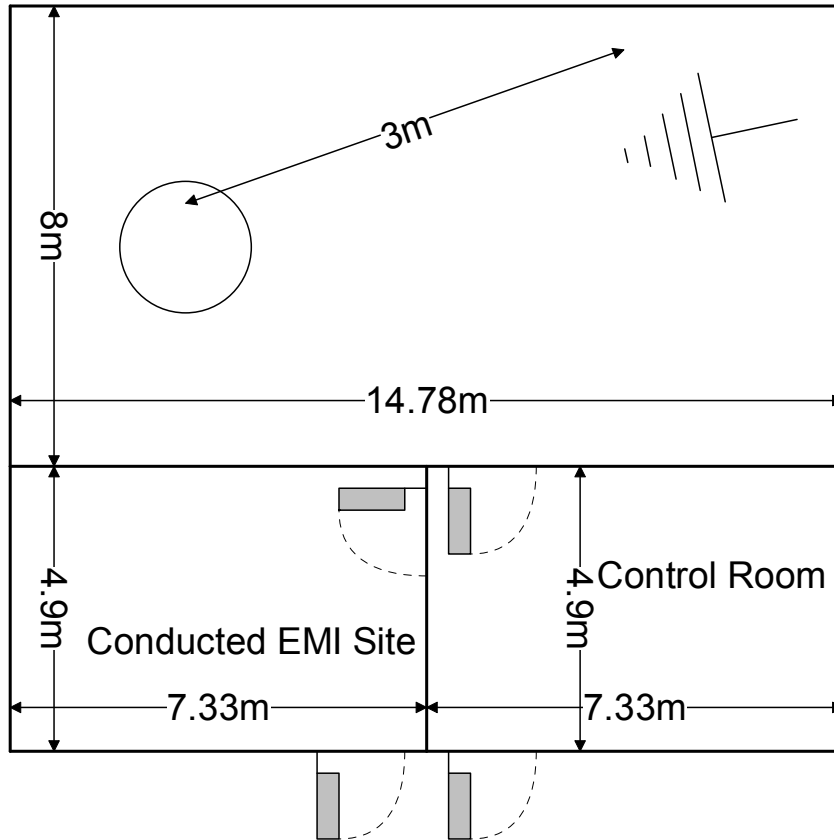


Figure 2.3.1-1: Semi-Anechoic Chamber Test Site

2.3.2 Conducted Emissions Test Site Description

The dimensions of the shielded conducted room are 7.3 x 4.9 x 3 m³. As per ANSI C63.4 2003 requirements, the data were taken using two LISNs; a Solar Model 8028-50 50 Ω/50 μH and an EMCO Model 3825, which are installed as shown in Photograph 3. For 220 V, 50 Hz, a Polarad LISN (S/N 879341/048) is used in conjunction with a 1 kVA, 50 Hz/220 V EDGAR variable frequency generator, Model 1001B, to filter conducted noise from the generator.

A diagram of the room is shown below in figure 2.3.2-1:

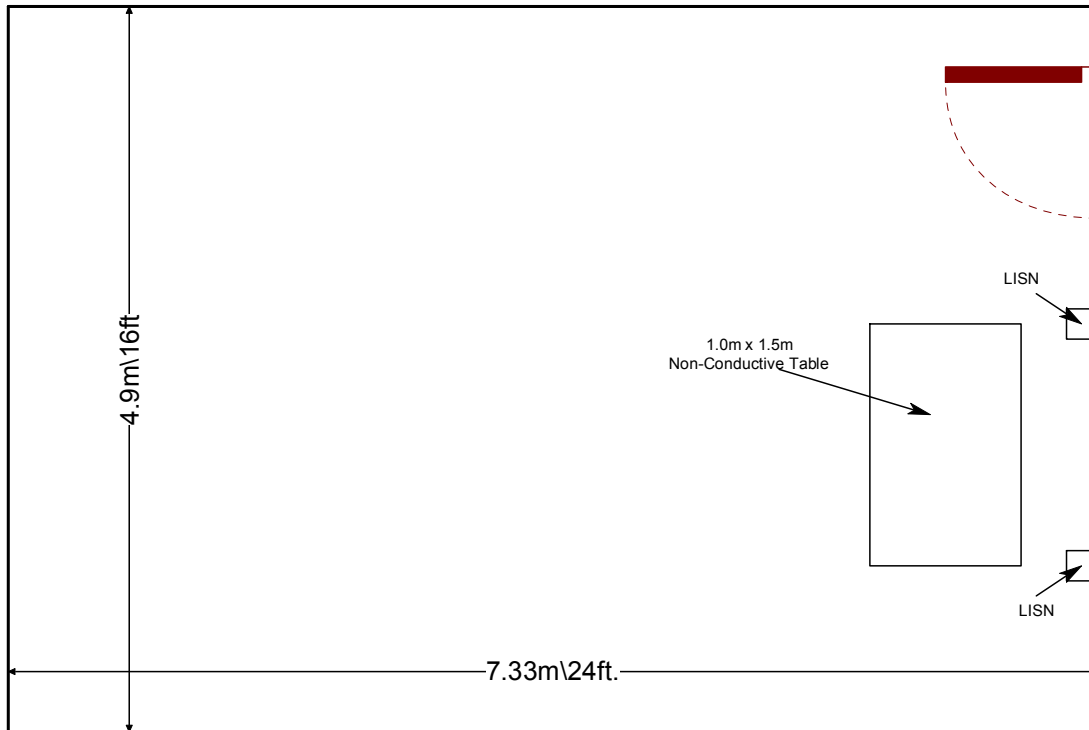


Figure 2.3.2-1: AC Mains Conducted EMI Site

3 APPLICABLE STANDARD REFERENCES

The following standards were used:

- ❖ ANSI C63.4-2003: Method of Measurements of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the 9KHz to 40GHz
- ❖ US Code of Federal Regulations (CFR): Title 47, Part 2, Subpart J: Equipment Authorization Procedures, 2010
- ❖ US Code of Federal Regulations (CFR): Title 47, Part 15, Subpart C: Radio Frequency Devices, Intentional Radiators, 2010
- ❖ Industry Canada Radio Standards Specification: RSS-210 - Low-power License-exempt Radiocommunication Devices (All Frequency Bands): Category I Equipment, Issue 7 June 2007
- ❖ Industry Canada Radio Standards Specification: RSS-GEN – General Requirements and Information for the Certification of Radiocommunication Equipment, Issue2, June 2007.

4 LIST OF TEST EQUIPMENT

The calibration interval of test equipment is annually or the manufacturer's recommendations. Where the calibration interval deviates from the annual cycle based on the instrument manufacturer's recommendations, it shall be stated below.

Table 4-1: Test Equipment

AssetID	Manufacturer	Model #	Equipment Type	Serial #	Cal Due Date
2002	EMCO	3108	Antennas	2147	9/10/2011
2004	EMCO	3146	Antennas	1385	9/10/2011
2006	EMCO	3115	Antennas	2573	2/21/2011
2011	Hewlett-Packard	HP 8447D	Amplifiers	2443A03952	1/4/2011
2012	Hewlett-Packard	HP83017A	Amplifiers	3123A00324	12/30/2010
2013	Hewlett Packard	HP8566B	Spectrum Analyzers	2407A03233	8/5/2012
2014	Hewlett Packard	HP 85650A	Quasi Peak Adapter	2430A00559	8/5/2012
2037	ACS Boca	Chamber EMI Cable Set	Cable Set	2037	12/30/2010
2044	QMI	N/A	Cables	2044	1/6/2011
RE40	Agilent Technologies	E7405A	Spectrum Analyzers	US39150132	7/20/2011

5 EQUIPMENT UNDER TEST AND SUPPORT EQUIPMENT

Table 5-1: EUT and Support Equipment

Item	Equipment Type	Manufacturer	Model Number	Serial Number
1	EUT	WNC	XSN1	JZA212M5
2	Antenna	Sirius XM	SX-7500-0067	N/A
3	FM Extender Antenna (FEA)	Sirius XM	FEA25	N/A
4	Cassette	Sirius XM	XMTTZ00257	N/A
5	Cigarette Lighter Socket with Twisted Pair Cable	Sirius XM	N/A	N/A
6	Car Battery	Johnsons Controls, Inc.	Everstart 26-5	N/A

Table 5-2: EUT and Support Equipment

Item	Equipment Type	Manufacturer	Model Number	Serial Number
1	EUT	WNC	XSN1	MNZ2124E
2	Antenna	Sirius XM Radio	SX-7500-0067	N/A
3	Auxiliary Cable	Sirius XM	VZCC-A4B9090-LP4	N/A
4	Cigarette Lighter Socket with Twisted Pair Cable	Sirius XM	N/A	N/A
5	Car Battery	Johnsons Controls, Inc.	Everstart 26-5	N/A

Table 5-3: EUT and Support Equipment

Item	Equipment Type	Manufacturer	Model Number	Serial Number
1	EUT	WNC	XSN1	MNZ2124E
2	Antenna	Sirius XM	SX-7500-0067	N/A
3	FM Direct Adapter	Sirius XM	FMDA25	N/A
4	Ground Plane with Whip Antenna	Sirius XM	N/A	N/A
5	Auxiliary Cable	Sirius XM	VZCC-A4B9090-LP4	N/A
6	Cigarette Lighter Socket with Twisted Pair Cable	Sirius XM	N/A	N/A
7	Car Battery	Johnsons Controls, Inc.	Everstart 26-5	N/A

6 EQUIPMENT UNDER TEST SETUP BLOCK DIAGRAM

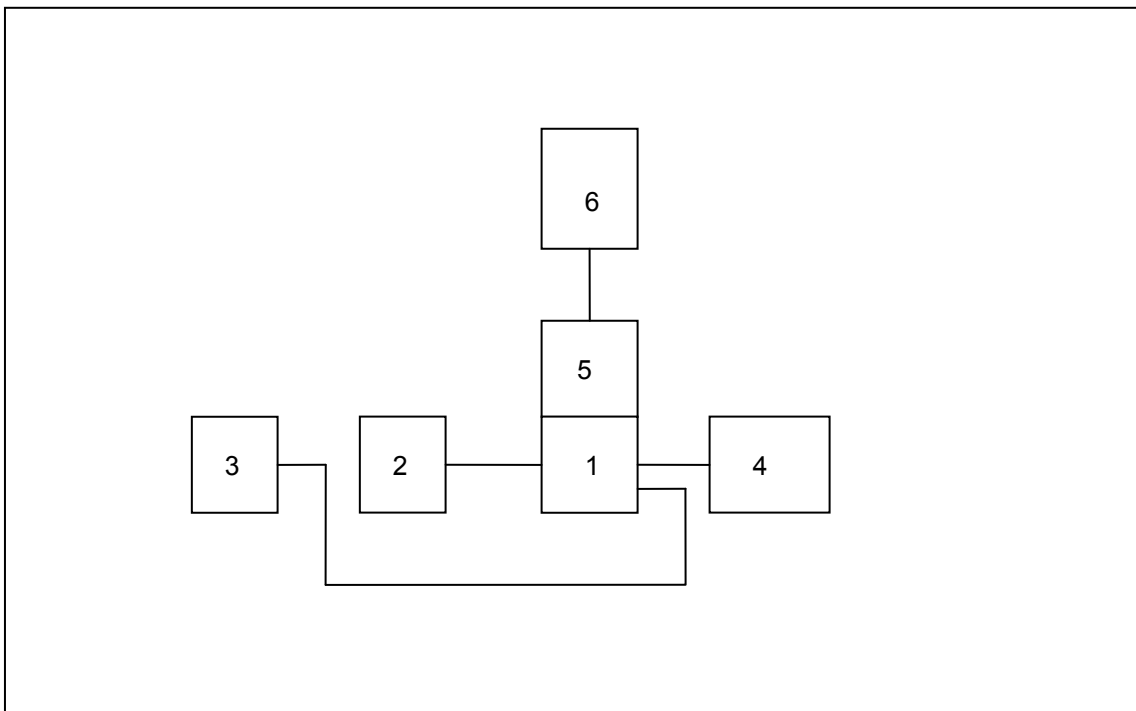


Figure 6-1: EUT with FEA and Cassette Adapter (See Table 5-1)

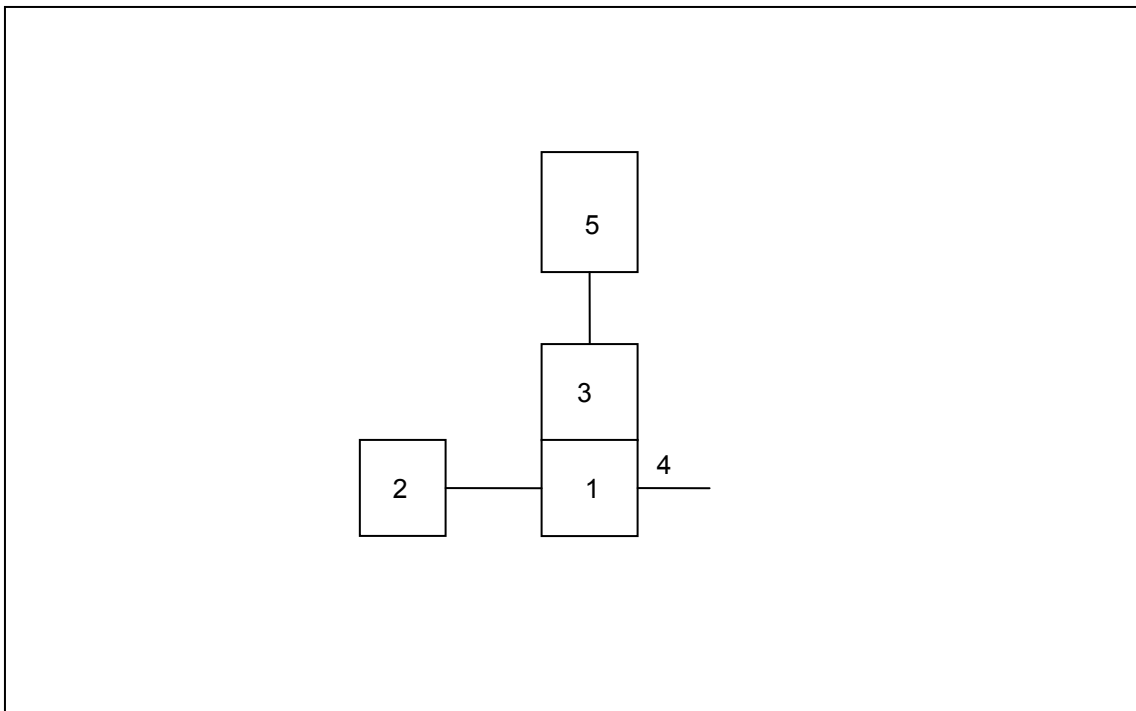


Figure 6-2: EUT (Power Connect) with audio Cable (See Table 5-2)

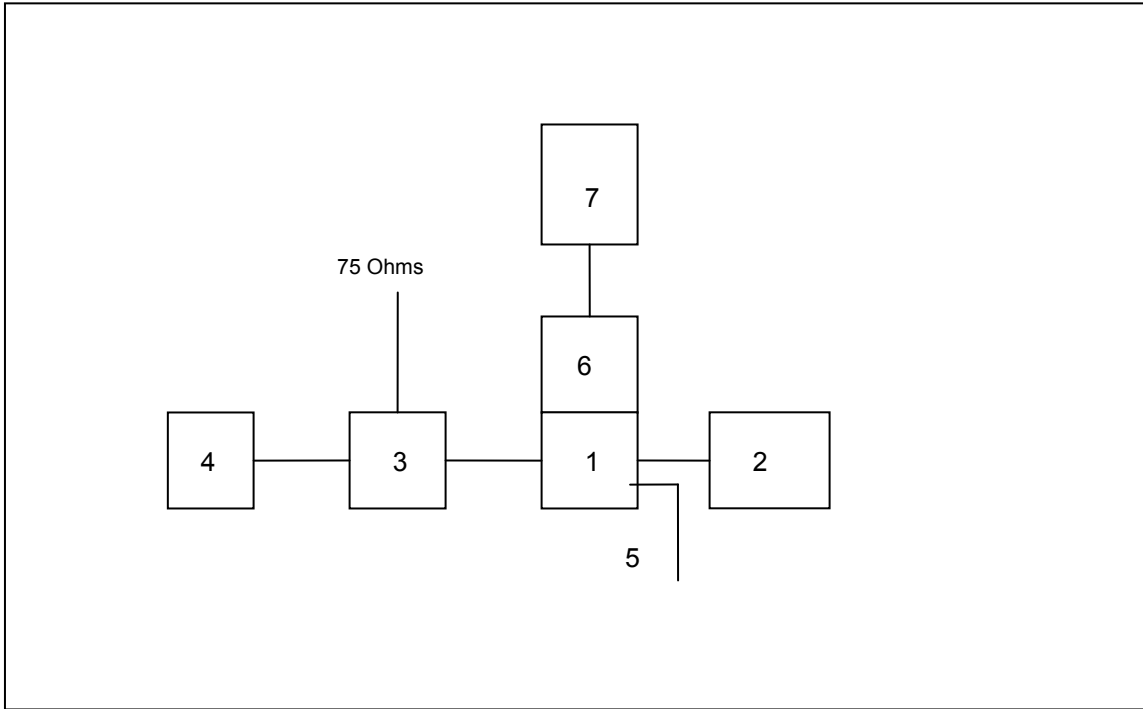


Figure 6-3: EUT with FM Direct (See Table 5-3)

7 SUMMARY OF TESTS

Along with the tabular data shown below, plots were taken of all signals deemed important enough to document.

7.1 Antenna Requirement – FCC: Section 15.203

The XM Snap, XSN1 radiates an FM signal in both Power Connect and FEA configurations. In the Power Connect mode, no external antenna is needed since the FM Snap couples the FM signal through the cigarette lighter adapter to the vehicle's wiring.

The FM Extendable Antenna (FEA) provides an alternative to the Power Connect mode. The FEA is to be connected to a 2.5 mm FM jack of the unit. When the 2.5 mm plug of the FEA is inserted in the FM port of the Sirius XM FM transmitter the FM signal no longer couples through the cigarette lighter adapter but radiates through the FEA cable.

7.2 Radiated Emissions – FCC: Section 15.109(Unintentional Radiation) IC: RSS-210 2.6**7.2.1 Measurement Procedure**

Radiated emissions tests were performed over the frequency range of 30 MHz to 16 GHz. Measurements of the radiated field strength were made at a distance of 3m from the boundary of the equipment under test (EUT) and the receiving antenna. The antenna height was varied from 1m to 4m so that the maximum radiated emissions level would be detected. Radiated measurements above 30MHz and below 1 GHz were made with the Spectrum Analyzer's resolution bandwidth set to 120 kHz using a Quasi-peak detector. Above 1 GHz, peak and average measurements are taken with the RBW and VBW were set to 1 MHz.

The XM Snap was tested in three configurations:

- a) FEA with a cassette adapter.
- b) Power Connect with an auxiliary cable.
- c) FM Direct with an auxiliary cable, a whip antenna and a ground plane.

For all three configurations, the FM tuner was set to 3 different frequencies corresponding to lower, middle and upper frequencies of the FM band. When peak and average measurements were required, the peak emission was compared to the average limit. When the peak emission failed the average limit, it was then compared to the peak limit.

7.2.2 Measurement Results

Results of the test are given in Table 7.2.2-1 to 7.2.2-9 below:

Table 7.2.2-1: Radiated Emissions Tabulated Data (FEA - 88.1 MHz)

Frequency (MHz)	Measured Level (dBuV)		Antenna Polarization (H/V)	Correction Factors (dB)	Corrected Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	
	Pk	Qpk/Av			Pk	Qpk/Av		Pk	Qpk/Av
116.50	40.40	---	H	15.85	24.55	---	43.50	18.95	---
153.90	47.10	---	H	13.76	33.34	---	43.50	10.16	---
193.70	45.20	---	H	12.04	33.16	---	43.50	10.34	---
200.00	44.05	---	H	11.60	32.45	---	43.50	11.05	---
339.20	41.45	---	H	10.28	31.17	---	46.00	14.83	---
702.40	33.25	---	H	2.04	31.21	---	46.00	14.79	---
750.40	34.35	---	H	1.44	32.91	---	46.00	13.09	---
799.20	29.10	---	H	1.00	28.10	---	46.00	17.90	---
3118.25	43.18	35.50	H	-8.92	52.10	44.42	54.00	1.90	9.58
3870.52	44.35	38.93	H	-11.80	56.15	50.73	54.00	-2.15	3.27
31.00	34.95	---	V	13.46	21.49	---	40.00	18.51	---
48.50	40.30	---	V	15.83	24.47	---	40.00	15.53	---
152.90	44.25	---	V	13.77	30.48	---	43.50	13.02	---
185.00	39.30	---	V	12.81	26.50	---	43.50	17.01	---
347.20	39.40	---	V	10.21	29.19	---	46.00	16.81	---
606.40	32.50	---	V	4.26	28.24	---	46.00	17.76	---
654.40	31.50	---	V	3.29	28.21	---	46.00	17.79	---
702.40	34.55	---	V	2.04	32.51	---	46.00	13.49	---
750.40	34.40	---	V	1.44	32.96	---	46.00	13.04	---
3870.52	41.13	31.75	V	-11.80	52.93	43.55	54.00	1.07	10.45

* Notes:

1. The peak emission at 3870.52 MHz complies with the peak limit of 74 dBuV/m.
2. All emissions above 3870 MHz were attenuated below the permissible limit.

Table 7.2.2-2: Radiated Emissions Tabulated Data (FEA - 96.9 MHz)

Frequency (MHz)	Measured Level (dBuV)		Antenna Polarization (H/V)	Correction Factors (dB)	Corrected Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	
	Pk	Qpk/Av			Pk	Qpk/Av		Pk	Qpk/Av
153.60	50.75	---	H	13.76	36.99	---	43.50	6.51	---
189.30	38.95	---	H	12.46	26.50	---	43.50	17.01	---
204.00	42.30	---	H	13.86	28.44	---	43.50	15.06	---
372.80	43.30	---	H	9.87	33.43	---	46.00	12.57	---
702.40	29.60	---	H	2.04	27.56	---	46.00	18.44	---
750.40	31.40	---	H	1.44	29.96	---	46.00	16.04	---
798.40	30.40	---	H	1.01	29.39	---	46.00	16.61	---
847.20	30.95	---	H	0.35	30.60	---	46.00	15.40	---
3118.30	42.50	36.08	H	-8.92	51.42	45.00	54.00	2.58	9.00
3483.60	42.10	34.92	H	-10.43	52.53	45.35	54.00	1.47	8.65
48.40	40.70	---	V	15.83	24.87	---	40.00	15.13	---
58.70	37.75	---	V	17.15	20.60	---	40.00	19.40	---
153.30	45.40	---	V	13.77	31.63	---	43.50	11.87	---
181.00	38.15	---	V	12.96	25.19	---	43.50	18.31	---
214.40	40.60	---	V	14.21	26.39	---	43.50	17.11	---
352.00	39.35	---	V	10.16	29.19	---	46.00	16.81	---
557.60	31.65	---	V	5.48	26.17	---	46.00	19.83	---
605.60	32.35	---	V	4.29	28.06	---	46.00	17.94	---
654.40	32.25	---	V	3.29	28.96	---	46.00	17.04	---
702.40	35.15	---	V	2.04	33.11	---	46.00	12.89	---
750.40	35.60	---	V	1.44	34.16	---	46.00	11.84	---

* Notes:

1. All emissions above 3483.6 MHz were attenuated below the permissible limit.

Table 7.2.2-3: Radiated Emissions Tabulated Data (FEA - 107.9 MHz)

Frequency (MHz)	Measured Level (dBuV)		Antenna Polarization (H/V)	Correction Factors (dB)	Corrected Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	
	Pk	Qpk/Av			Pk	Qpk/Av		Pk	Qpk/Av
117.00	42.50	---	H	15.78	26.72	---	43.50	16.78	---
153.60	45.45	---	H	13.76	31.69	---	43.50	11.81	---
189.10	39.00	---	H	12.48	26.52	---	43.50	16.98	---
217.60	42.00	---	H	14.28	27.72	---	46.00	18.28	---
300.80	38.85	---	H	10.74	28.11	---	46.00	17.89	---
372.80	44.70	---	H	9.87	34.83	---	46.00	11.17	---
702.40	31.85	---	H	2.04	29.81	---	46.00	16.19	---
750.40	34.15	---	H	1.44	32.71	---	46.00	13.29	---
799.20	29.55	---	H	1.00	28.55	---	46.00	17.45	---
3118.30	43.20	36.15	H	-8.92	52.12	45.07	54.00	1.88	8.93
3448.50	42.55	34.29	H	-10.29	52.84	44.58	54.00	1.16	9.42
48.50	43.05	---	V	15.83	27.22	---	40.00	12.78	---
97.20	44.05	---	V	18.16	25.89	---	43.50	17.61	---
153.60	42.15	---	V	13.76	28.39	---	43.50	15.11	---
181.10	38.70	---	V	12.96	25.74	---	43.50	17.76	---
372.80	39.50	---	V	9.87	29.63	---	46.00	16.37	---
606.40	32.40	---	V	4.26	28.14	---	46.00	17.86	---
654.80	32.80	---	V	3.29	29.51	---	46.00	16.49	---
702.40	35.00	---	V	2.04	32.96	---	46.00	13.04	---
750.40	36.00	---	V	1.44	34.56	---	46.00	11.44	---
800.00	29.90	---	V	1.00	28.90	---	46.00	17.10	---

* Notes:

1. All emissions above 3448 MHz were attenuated below the permissible limit.

Table 7.2.2-4: Radiated Emissions Tabulated Data (Power Connect - 88.1 MHz)

Frequency (MHz)	Measured Level (dBuV)		Antenna Polarization (H/V)	Correction Factors (dB)	Corrected Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	
	Pk	Qpk/Av			Pk	Qpk/Av		Pk	Qpk/Av
150.50	48.65	---	H	13.80	34.85	---	43.50	8.65	---
217.60	37.05	---	H	14.28	22.77	---	46.00	23.23	---
339.20	47.55	---	H	10.28	37.27	---	46.00	8.73	---
356.80	45.75	---	H	10.09	35.66	---	46.00	10.34	---
458.40	34.80	---	H	7.53	27.27	---	46.00	18.73	---
3118.30	44.20	39.38	H	-8.92	53.12	48.30	54.00	0.88	5.70
3870.60	40.85	31.93	H	-11.80	52.65	43.73	54.00	1.35	10.27
4677.45	40.25	32.19	H	-14.27	54.52	46.46	54.00	-0.52	7.54
150.90	47.55	---	V	13.79	33.76	---	43.50	9.74	---
175.50	36.05	---	V	13.28	22.77	---	43.50	20.73	---
338.40	41.60	---	V	10.31	31.29	---	46.00	14.71	---
368.80	39.75	---	V	9.98	29.77	---	46.00	16.23	---
558.40	32.95	---	V	5.44	27.51	---	46.00	18.49	---
605.60	31.95	---	V	4.29	27.66	---	46.00	18.34	---
654.40	30.50	---	V	3.29	27.21	---	46.00	18.79	---
702.40	30.95	---	V	2.04	28.91	---	46.00	17.09	---
750.40	30.65	---	V	1.44	29.21	---	46.00	16.79	---
799.20	28.35	---	V	1.00	27.35	---	46.00	18.65	---

* Notes:

1. The peak emission at 4677.45 MHz complies with the peak limit of 74 dBuV/m.
2. All emissions above 4677.45 MHz were attenuated below the permissible limit.

Table 7.2.2-5: Radiated Emissions Tabulated Data (Power Connect - 96.9 MHz)

Frequency (MHz)	Measured Level (dBuV)		Antenna Polarization (H/V)	Correction Factors (dB)	Corrected Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	
	Pk	Qpk/Av			Pk	Qpk/Av		Pk	Qpk/Av
151.90	46.10	---	H	13.78	32.32	---	43.50	11.18	---
334.40	49.25	---	H	10.46	38.79	---	46.00	7.21	---
342.40	48.20	---	H	10.24	37.96	---	46.00	8.04	---
372.80	42.60	---	H	9.87	32.73	---	46.00	13.27	---
3118.30	45.25	39.65	H	-8.92	54.17	48.57	54.00	-0.17	5.43
3870.60	40.85	33.30	H	-11.80	52.65	45.10	54.00	1.35	8.90
151.20	48.50	---	V	13.79	34.71	---	43.50	8.79	---
342.40	46.50	---	V	10.24	36.26	---	46.00	9.74	---
372.80	37.15	---	V	9.87	27.28	---	46.00	18.72	---
556.80	32.30	---	V	5.52	26.78	---	46.00	19.22	---
606.40	31.15	---	V	4.26	26.89	---	46.00	19.11	---
653.60	30.70	---	V	3.32	27.38	---	46.00	18.62	---
702.40	30.20	---	V	2.04	28.16	---	46.00	17.84	---
750.40	30.25	---	V	1.44	28.81	---	46.00	17.19	---

* Notes:

1. The peak emission at 3118.30 MHz complies with the peak limit of 74 dBuV/m.
2. All emissions above 3870 MHz were attenuated below the permissible limit.

Table 7.2.2-6: Radiated Emissions Tabulated Data (Power Connect - 107.9 MHz)

Frequency (MHz)	Measured Level (dBuV)		Antenna Polarization (H/V)	Correction Factors (dB)	Corrected Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	
	Pk	Qpk/Av			Pk	Qpk/Av		Pk	Qpk/Av
151.60	51.15	---	H	13.78	37.37	---	43.50	6.13	---
216.00	41.45	---	H	14.25	27.20	---	43.50	16.30	---
334.40	49.95	---	H	10.46	39.49	---	46.00	6.51	---
606.40	30.95	---	H	4.26	26.69	---	46.00	19.31	---
3118.20	45.55	40.55	H	-8.92	54.47	49.47	54.00	-0.47	4.53
3879.60	40.95	32.63	H	-11.83	52.78	44.46	54.00	1.22	9.54
4677.60	41.66	32.85	H	-14.27	55.93	47.12	54.00	-1.93	6.88
150.20	48.00	---	V	13.80	34.20	---	43.50	9.30	---
372.80	38.55	---	V	9.87	28.68	---	46.00	17.32	---
377.60	45.60	---	V	9.70	35.90	---	46.00	10.10	---
556.80	33.00	---	V	5.52	27.48	---	46.00	18.52	---
605.60	31.45	---	V	4.29	27.16	---	46.00	18.84	---
654.40	31.40	---	V	3.29	28.11	---	46.00	17.89	---
702.40	30.10	---	V	2.04	28.06	---	46.00	17.94	---
798.40	28.85	---	V	1.01	27.84	---	46.00	18.16	---

* Note:

1. The peak emissions at 3118.20 and 4677.60 MHz comply with the peak limit of 74 dBuV/m.
2. All emissions above 4677 MHz were attenuated below the permissible limit.

Table 7.2.2-7: Radiated Emissions Tabulated Data (FM Direct - 88.1 MHz)

Frequency (MHz)	Measured Level (dBuV)		Antenna Polarization (H/V)	Correction Factors (dB)	Corrected Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	
	Pk	Qpk/Av			Pk	Qpk/Av		Pk	Qpk/Av
87.10	40.30	---	H	19.18	21.12	---	40.00	18.88	---
150.70	50.00	48.36	H	13.79	36.21	34.57	43.50	7.29	8.93
200.00	42.90	---	H	11.60	31.30	---	43.50	12.20	---
313.60	39.55	---	H	10.29	29.26	---	46.00	16.74	---
342.40	42.20	---	H	10.24	31.96	---	46.00	14.04	---
368.80	44.60	---	H	9.98	34.62	---	46.00	11.38	---
605.60	30.95	---	H	4.29	26.66	---	46.00	19.34	---
3118.30	43.85	37.57	H	-8.92	52.77	46.49	54.00	1.23	7.51
3870.60	40.95	33.86	H	-11.80	52.75	45.66	54.00	1.25	8.34
6236.00	44.24	35.73	H	-8.43	52.67	44.16	54.00	1.33	9.84
30.70	42.85	---	V	13.43	29.42	---	40.00	10.58	---
40.70	37.45	---	V	15.05	22.40	---	40.00	17.60	---
113.50	43.15	---	V	16.23	26.92	---	43.50	16.58	---
128.40	42.50	---	V	14.35	28.15	---	43.50	15.35	---
152.10	46.95	---	V	13.78	33.17	---	43.50	10.33	---
167.70	40.10	---	V	13.55	26.55	---	43.50	16.95	---
200.00	43.35	---	V	11.60	31.75	---	43.50	11.75	---
343.20	39.35	---	V	10.24	29.11	---	46.00	16.89	---
374.40	41.90	---	V	9.82	32.08	---	46.00	13.92	---
702.40	30.85	---	V	2.04	28.81	---	46.00	17.19	---
750.40	30.40	---	V	1.44	28.96	---	46.00	17.04	---
6236.00	44.72	35.39	V	-8.43	53.15	43.82	54.00	0.85	10.18

* Note:

1. All emissions above 6236 MHz were attenuated below the permissible limit.

Table 7.2.2-8: Radiated Emissions Tabulated Data (FM Direct - 96.9 MHz)

Frequency (MHz)	Measured Level (dBuV)		Antenna Polarization (H/V)	Correction Factors (dB)	Corrected Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	
	Pk	Qpk/Av			Pk	Qpk/Av		Pk	Qpk/Av
151.40	50.40	---	H	13.79	36.61	---	43.50	6.89	---
164.40	37.25	---	H	13.56	23.69	---	43.50	19.81	---
200.01	43.25	---	H	13.70	29.55	---	43.50	13.95	---
308.00	39.10	---	H	10.26	28.84	---	46.00	17.16	---
342.40	44.70	---	H	10.24	34.46	---	46.00	11.54	---
374.40	44.00	---	H	9.82	34.18	---	46.00	11.82	---
3118.30	44.90	38.81	H	-8.92	53.82	47.73	54.00	0.18	6.27
3870.60*	42.75	34.47	H	-11.80	54.55	46.27	54.00	-0.55	7.73
4677.50*	41.20	32.65	H	-14.27	55.47	46.92	54.00	-1.47	7.08
6236.00	45.03	36.05	H	-8.43	53.46	44.48	54.00	0.54	9.52
41.60	38.85	---	V	15.15	23.70	---	40.00	16.30	---
56.70	38.75	---	V	16.96	21.79	---	40.00	18.21	---
113.50	42.10	---	V	16.23	25.87	---	43.50	17.63	---
125.00	42.80	---	V	14.72	28.08	---	43.50	15.42	---
152.10	47.75	---	V	13.78	33.97	---	43.50	9.53	---
200.00	41.80	---	V	11.60	30.20	---	43.50	13.30	---
339.20	41.70	---	V	10.28	31.42	---	46.00	14.58	---
374.40	39.90	---	V	9.82	30.08	---	46.00	15.92	---
702.40	29.70	---	V	2.04	27.66	---	46.00	18.34	---
750.40	30.00	---	V	1.44	28.56	---	46.00	17.44	---
3118.30	41.90	33.51	V	-8.92	50.82	42.43	54.00	3.18	11.57
6236.00	44.69	36.70	V	-8.43	53.12	45.13	54.00	0.88	8.87

* Notes:

1. The peak emissions at 3870.6 and 4677.5 MHz comply with the peak limit of 74 dB μ V/m.
2. All emissions above 6236 MHz were attenuated below the permissible limit.

Table 7.2.2-9: Radiated Emissions Tabulated Data (FM Direct - 107.9 MHz)

Frequency (MHz)	Measured Level (dBuV)		Antenna Polarization (H/V)	Correction Factors (dB)	Corrected Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	
	Pk	Qpk/Av			Pk	Qpk/Av		Pk	Qpk/Av
150.50	44.45	---	H	13.80	30.65	---	43.50	12.85	---
87.30	42.65	---	H	19.16	23.49	---	40.00	16.51	---
200.00	43.45	---	H	13.70	29.75	---	43.50	13.75	---
373.60	45.70	---	H	9.85	35.85	---	46.00	10.15	---
308.80	39.15	---	H	10.21	28.94	---	46.00	17.06	---
3118.30	44.00	37.95	H	-8.92	52.92	46.87	54.00	1.08	7.13
6236.00	44.48	33.96	H	-8.43	52.91	42.39	54.00	1.09	11.61
159.40	43.60	---	V	13.53	30.07	---	43.50	13.43	---
124.90	41.95	---	V	14.72	27.23	---	43.50	16.27	---
41.90	39.00	---	V	15.18	23.82	---	40.00	16.18	---
32.70	37.30	---	V	13.79	23.51	---	40.00	16.49	---
200.00	43.20	---	V	13.70	29.50	---	43.50	14.00	---
334.40	39.70	---	V	10.46	29.24	---	46.00	16.76	---
369.60	38.95	---	V	9.98	28.97	---	46.00	17.03	---
606.40	32.50	---	V	4.26	28.24	---	46.00	17.76	---
702.40	30.25	---	V	2.04	28.21	---	46.00	17.79	---
750.40	29.70	---	V	1.44	28.26	---	46.00	17.74	---
6236.00	45.15	36.82	V	-8.43	53.58	45.25	54.00	0.42	8.75

*Notes:

1. All emissions above 6236 MHz were attenuated below the permissible limit.

7.3 20 dB Bandwidth - FCC: Section 15.239 (a) IC: RSS-210 A2.8

7.3.1 Measurement Procedure (Conducted Method)

The RF output port of the EUT was directly connected to the input of the spectrum analyzer. The spectrum analyzer span was set to 2 to 3 times the estimated bandwidth of the emission. The RBW was to $\geq 1\%$ of the estimated emission bandwidth. The trace was set to max hold with a peak detector active. The Delta function of the analyzer was utilized to determine the 20 dB bandwidth of the emission. The same procedure was used to measure the 99% (26 dB) bandwidth.

7.3.2 Measurement Results

Results are shown below in Table 7.3.2-1 and Figures 7.3.2-1 through 7.3.2-6.

Table 7.3.2-1: 20dB

Frequency [MHz]	20dB Bandwidth [kHz]	99% (26dB) Bandwidth [kHz]
88.1	166.5	188.5
96.9	150.5	190.5
107.9	168.0	182.5

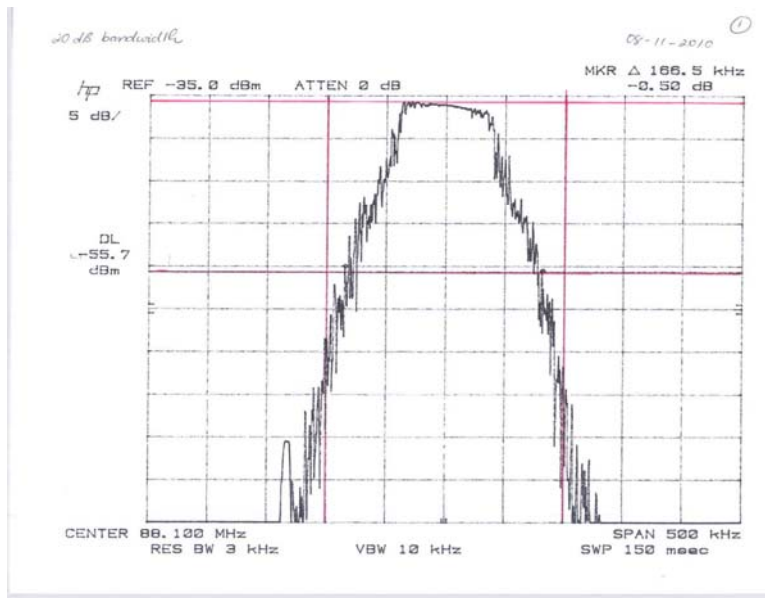


Figure 7.3.2-1: 20dB BW Low Channel

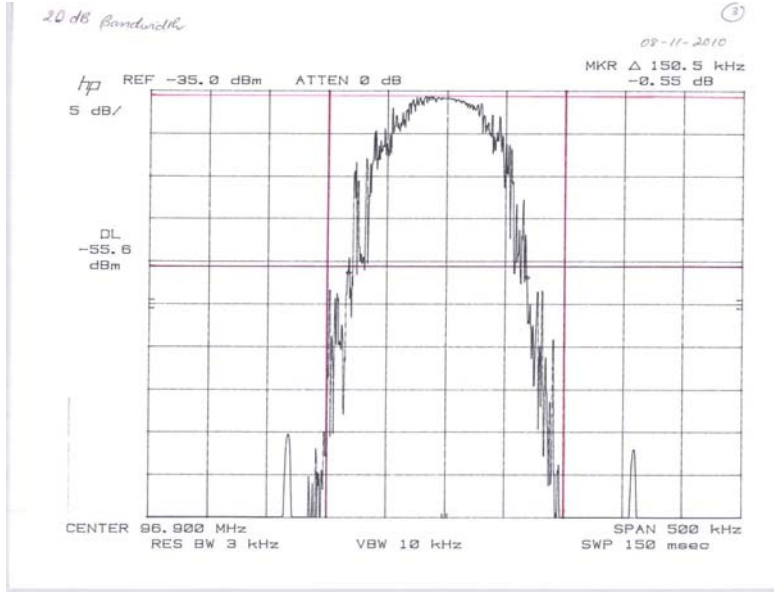


Figure 7.3.2-2: 20dB BW Middle Channel

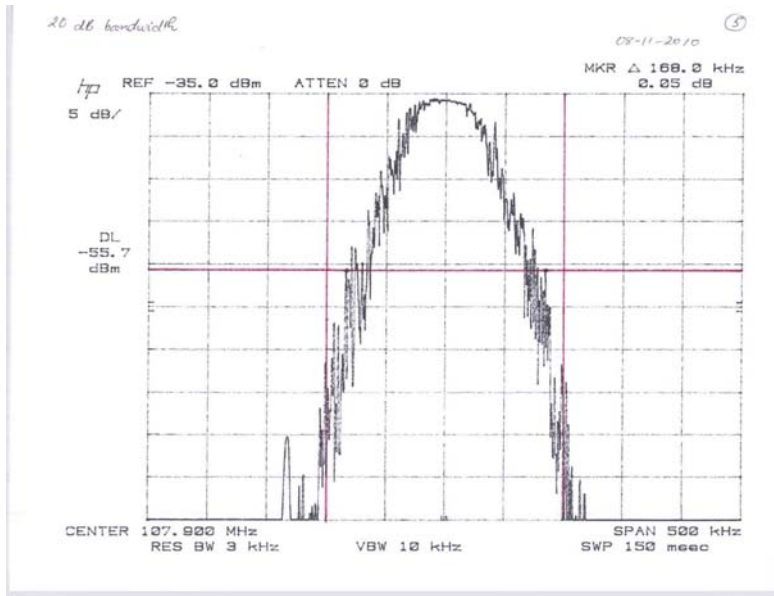


Figure 7.3.2-3: 20dB BW High Channel

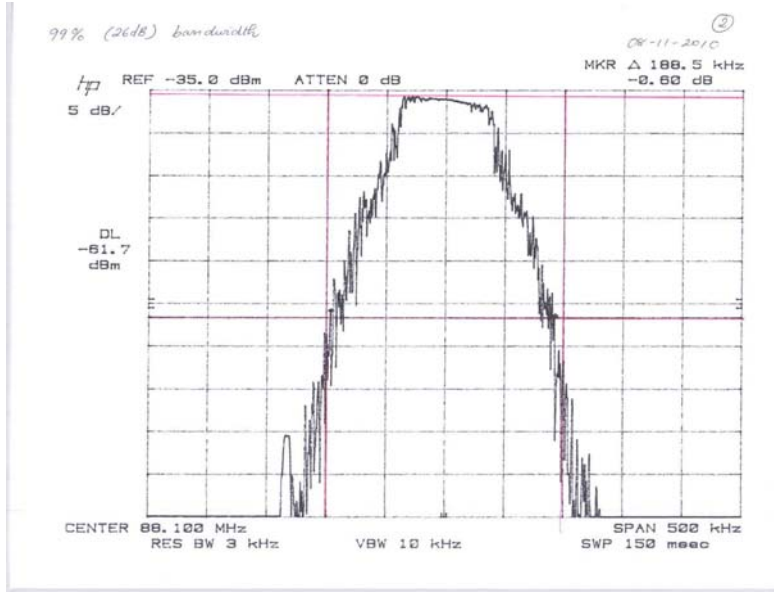


Figure 7.3.2-4: 99% (26dB) BW Low Channel

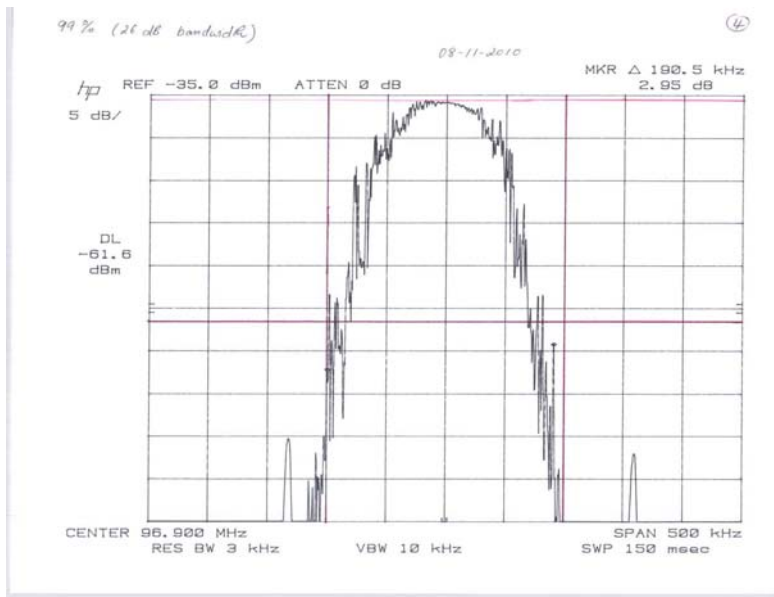


Figure 7.3.2-5: 99% (26 dB) BW Middle Channel

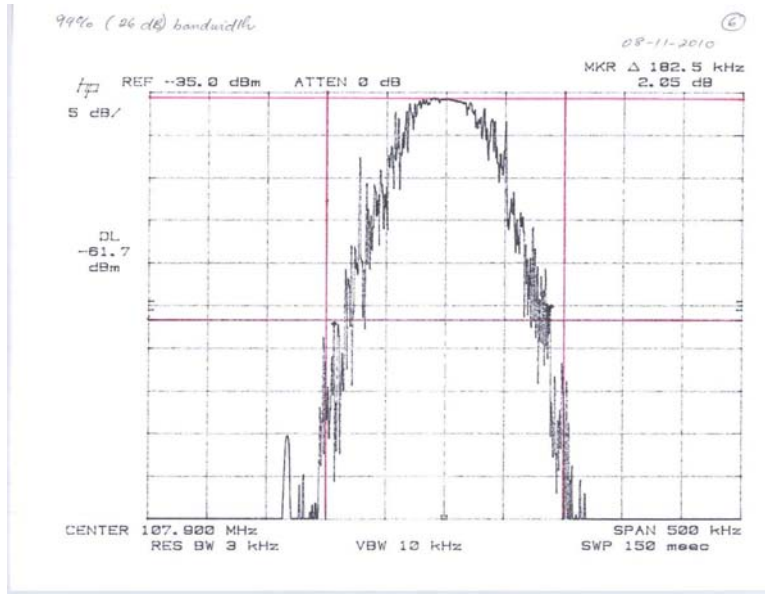


Figure 7.3.2-6: 99% (26dB) BW High Channel

7.4 Transmitter Field Strength – FCC Section 15.239 (b) IC: RSS-210 A2.8 (b)

7.4.1 Measurement Procedure

The EUT was rotated through 360° and the receive antenna height was varied from 1m to 4m so that the maximum radiated emissions level would be detected. The measurements were made using a resolution bandwidth RBW of 120 kHz and a video bandwidth VBW of 1 MHz.

The measurements were performed for both Power Connect and FEA FM transmitting configurations. The cables were maximized for worst case FM emissions.

7.4.2 Measurement Results

Results are shown below in Table 7.4.2-1 and 7.4.2-2.

Table 7.4.2-1: Fundamental E-Field (Power Connect)

Frequency (MHz)	Measured Level (dBuV)	Antenna Polarization (H/V)	Correction Factors (dB)	Corrected Level (dBuV/m)	Limit (dBuV/m)		Margin (dB)	
	Pk			Pk	FCC	IC	FCC	IC
88.1	62.6	H	19.12	43.48	48	60	4.52	16.52
88.1	57.7	V	19.12	38.58	48	60	9.42	21.42
96.9	56.1	H	18.21	37.89	48	60	10.11	22.11
96.9	54.95	V	18.21	36.74	48	60	11.26	23.26
107.9	53.95	H	16.97	36.98	48	60	11.02	23.02
107.9	55.85	V	16.97	38.88	48	60	9.12	21.12

Table 7.4.2-2: Fundamental E-Field (FEA)

Frequency (MHz)	Measured Level (dBuV)	Antenna Polarization (H/V)	Correction Factors (dB)	Corrected Level (dBuV/m)	Limit (dBuV/m)		Margin (dB)	
	Pk			Pk	FCC	IC	FCC	IC
88.1	57.25	H	19.12	38.13	48	60	9.87	21.87
88.1	50.7	V	19.12	31.58	48	60	16.42	28.42
96.9	57.65	H	18.21	39.44	48	60	8.56	20.56
96.9	52.75	V	18.21	34.54	48	60	13.46	25.46
107.9	58.55	H	16.97	41.58	48	60	6.42	18.42
107.9	52.73	V	16.97	35.76	48	60	12.24	24.24

7.5 Radiated Spurious Emissions - FCC Section 15.209 IC: RSS-210 2.6

7.5.1 Measurement Procedure

Radiated emissions tests were made over the frequency range of 30 MHz to 16 GHz, 10 times the highest fundamental frequency or 5 times the highest digital or tuning frequency, whichever is higher.

The EUT was rotated through 360° and the receive antenna height was varied from 1m to 4m so that the maximum radiated emissions level would be detected. For frequencies below 1000 MHz, quasi-peak measurements were made using a resolution bandwidth RBW of 120 kHz and a video bandwidth VBW of 300 kHz. For frequencies above 1000 MHz, peak and average measurements made with RBW and VBW of 1 MHz and 3 MHz respectively.

7.5.2 Measurement Results

Radiated spurious emissions found in the band of 30MHz to 16 GHz are reported in the Tables 7.5.2-1 to 7.5.2-6 below. Spurious emissions that were attenuated below the sensitivity of the spectrum analyzer or were more than 20 dB below the limits are not included.

Table 7.5.2-1: Radiated Spurious Emissions Tabulated Data (Power Connect, 88.1 MHz)

Frequency (MHz)	Measured Level (dBuV)		Antenna Polarization (H/V)	Correction Factors (dB)	Corrected Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	
	Pk	Qpk/Av			Pk	Qpk/Av		Pk	Qpk/Av

* Note: All spurious emissions were attenuated below the noise floor of the measurement equipment.

Table 7.5.2-2: Radiated Spurious Emissions Tabulated Data (Power Connect, 96.9 MHz)

Frequency (MHz)	Measured Level (dBuV)		Antenna Polarization (H/V)	Correction Factors (dB)	Corrected Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	
	Pk	Qpk/Av			Pk	Qpk/Av		Pk	Qpk/Av

* Note: All spurious emissions were attenuated below the noise floor of the measurement equipment.

Table 7.5.2-3: Radiated Spurious Emissions Tabulated Data (Power Connect, 107.9 MHz)

Frequency (MHz)	Measured Level (dBuV)		Antenna Polarization (H/V)	Correction Factors (dB)	Corrected Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	
	Pk	Qpk/Av			Pk	Qpk/Av		Pk	Qpk/Av

* Note: All spurious emissions were attenuated below the noise floor of the measurement equipment.

Table 7.5.2-4: Radiated Spurious Emissions Tabulated Data (FEA, 88.1 MHz)

Frequency (MHz)	Measured Level (dBuV)		Antenna Polarization (H/V)	Correction Factors (dB)	Corrected Level (dBuV/m)		Limit (dBuV/m) Qpk/Av	Margin (dB)	
	Pk	Qpk/Av			Pk	Qpk/Av		Pk	Qpk/Av

* Note: All spurious emissions were attenuated below the noise floor of the measurement equipment.

Table 7.5.2-5: Radiated Spurious Emissions Tabulated Data (FEA, 96.9 MHz)

Frequency (MHz)	Measured Level (dBuV)		Antenna Polarization (H/V)	Correction Factors (dB)	Corrected Level (dBuV/m)		Limit (dBuV/m) Qpk/Av	Margin (dB)	
	Pk	Qpk/Av			Pk	Qpk/Av		Pk	Qpk/Av

* Note: All spurious emissions were attenuated below the noise floor of the measurement equipment.

Table 7.5.2-6: Radiated Spurious Emissions Tabulated Data (FEA, 107.9 MHz)

Frequency (MHz)	Measured Level (dBuV)		Antenna Polarization (H/V)	Correction Factors (dB)	Corrected Level (dBuV/m)		Limit (dBuV/m) Qpk/Av	Margin (dB)	
	Pk	Qpk/Av			Pk	Qpk/Av		Pk	Qpk/Av

* Note: All spurious emissions were attenuated below the noise floor of the measurement equipment.

7.5.3 Sample Calculation:

$$R_C = R_U + CF_T$$

Where:

CF_T	=	Total Correction Factor (AF+CA+AG)-DC (Average Measurements Only)
R_U	=	Uncorrected Reading
R_C	=	Corrected Level
AF	=	Antenna Factor
CA	=	Cable Attenuation
AG	=	Amplifier Gain
DC	=	Duty Cycle Correction Factor

Example Calculation: Average

Corrected Level: $36.15 + 8.92 - 0 = 45.07 \text{ dBuV/m}$

Margin: $54 \text{ dBuV/m} - 45.07 \text{ dBuV/m} = 8.93 \text{ dB}$

8 CONCLUSION

In the opinion of ACS, Inc. the XM Snap, XSN1, manufactured by XM Radio Inc. meets the requirements of FCC Part 15 subpart C and Industry Canada's Radio Standards Specification RSS-210.

END REPORT